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ABSTRACT

The effects of drug abuse and dependence vary, depending on the type of drug, polydrug use, and characteristics of the user. The influence of genetic, neurochemical, neuropsychological, sociocultural, and economic factors suggest that the etiology of substance abuse and dependence is multiply determined. Models explaining the causation of substance abuse have arisen and various classification systems for drugs, their effects, and the behavior of persons abusing drugs have been developed. This paper presents an overview of the characteristics of drugs commonly abused and their effects. Drugs discussed are: alcohol, inhalants, marijuana, LSD and other hallucinogens, caffeine, amphetamines and other stimulants, tobacco, barbiturates and non-barbiturate sedatives, opiates, cocaine, prescription drugs, and over-the-counter medications. Information provided about drugs and about aspects of substance abuse provides counselors with perspectives they can use to increase the effectiveness of their communications with clients and with others who work with or care about consumers and their families. Also included is a facilitator's manual which is a practical guide for teaching content through guided experiential projects. Six objectives are listed. Five student exercises are provided. (MKA)

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Drugs and Addictions

S. Mae Smith & Eva Miller

Characteristics of Drugs

The word "drug" in American society is no longer a neutral term. While many drugs are of great benefit to mankind, the word "drugs" is often used to refer only to drugs of abuse, illegal substances, or chemical compounds which are associated with high addiction potential. Drugs, such as vaccines, antibiotics, psychopharmaceuticals, oral contraceptives, and medications which assist to restore normal bodily functioning, used correctly greatly enrich quantity, quality of life or both. The great number of psychological, physical, and social problems associated with drugs arise from the illegal use, misuse and abuse, or both of substances rather than from the mere existence of these substances.

When substances themselves are blamed for drug-related problems, the tendency exists to focus on elimination of the drug itself rather than on addressing the factors that lead to the abuse of the drug. Effects of a drug will depend not only upon the drug itself but upon individual interactions of characteristics of the substance, the physiological and psychological states of the user, and the environment in which the drug is used (Blum, 1984). However, history indicates that some drugs have most commonly been used not just for their therapeutic effects but also for recreational purposes. Likewise, some drugs have been more commonly overused, abused, or misused than others. Knowledge of some common effects of the most frequently abused substances may assist the counselor in understanding and communicating about client behavior.

The purpose of this chapter is to introduce counselors to common characteristics of frequently abused substances. It is hoped that such information will increase the ability of counselors to: (1) understand certain drugs, their effects and client behavior; and (2) explain to clients and other publics the common effects of certain drugs.

General Considerations

Drugs affect the human body in many different ways. Individual variations occur with any drug. In analysis of how any drug affects the body, knowledge of several processes are important. As described by Leung (1976, p. 34), such processes include:

1. Administration, or how does the drug enter the body?
2. Absorption, or how does the drug get from the site of administration into the physiological system of the body?
3. Distribution, or how is the drug distributed to the parts of the body?
4. Action, or how and where does the drug produce its effects?
5. Physiological Fate, or how is the drug inactivated, metabolized and/or eliminated from the body?

The aforementioned factors are affected by many variables, including individual differences in body functioning; disease; presence of other drugs, foods or liquid; exercise and activity level; amount of substance placed in the body within a certain time frame; energy and endurance levels, including amount of sleep; and body weight (Seixas, 1975). Differences in when effects reported (subjective) and when actual (physiological/functional) effects ceased are typical of some substances (Levinthal, 1996). Also of importance is that "street drugs" often are not what they are claimed to be in purity, chemical composition, or quantity (Ray & Ksir, 1996). The actual concentrations, frequency, and duration of exposure over a lifetime to a particular substance or a similar substance may alter effects of a particular drug on a particular individual (Levinthal, 1996).

Studies of the effects of drugs are most commonly conducted on healthy adult males under age 35. In many drug studies, information is not available on the effects of substances upon older individuals or upon individuals whose physical systems have been compromised by disability or chronic illness. Often, drug studies focus on short-term effects to the exclusion of long-term effects.

Alcohol

Alcohol is the most abused drug in American society (Parsons, 1996). "Drug dependence of the alcohol

type may be said to exist when the consumption of alcohol by an individual exceeds the limits that are accepted by his [sic] culture" (Leung, 1976, p. 45). Indications exist that alcohol was used in Egypt over 6,000 years ago. Because of the frequent resistance in American society to acknowledge that alcohol is a psychoactive drug, the phrase "drugs and alcohol" is commonly used, inaccurately implying that alcohol is not a drug (Levinthal, 1996). Wine, "dessert wines," wine-like variations such as hard cider or sake, beers (draft or lager beer, ale, and malt liquor), and distilled spirits or liquor all are alcoholic substances which contain alcohol but vary in percent of alcohol content (Becker, Roe, & Scott, 1979). Dependence, addiction or both may occur related to any of the above alcohol-containing substances.

Since alcohol is moderately soluble in fat and highly soluble in water and is a small molecule, it is easily absorbed by the gastrointestinal tract without the need for digestion (Levinthal, 1996). The solubility of alcohol facilitates its distribution to all bodily tissues. The solubility of alcohol in fat allows almost 90% of alcohol in the blood to reach the brain almost immediately.

Alcohol has a progressive, depressant effect upon the central nervous system [CNS] (Seixas, 1975; Levinthal, 1996). The CNS depressant effect of alcohol is often misinterpreted initially as a stimulant effect as the substance reduces functioning of an area of the brain that normally inhibits behaviors. Depressing the inhibitory effects of certain brain centers may result in increases in activity level, in increases in aggression or sexual behaviors, and in reduction of social inhibitions. Computerized brain tomography of chronic alcoholics has shown cortical shrinkage, ventricular dilation, or both (O'Donnell & O'Callaghan, 1997). Neuropsychological functioning associated with intermediate stages of alcoholism include mild to moderate impairment on tests measuring memory and learning, abstracting and problem-solving, perceptual-spatial abilities, information-processing speed, and perceptual-motor speed (Parsons, 1996). Verbal abilities of alcoholics usually remain intact.

"Alcoholism continues to be one of the leading public health problems in the western world" (O'Donnell & O'Callaghan, 1997, p. 272). The decrease in general physical health has been attributed to multiple aspects of alcoholism, including general life style, use of other drugs, inadequate hygiene, injury due to accidents, stress, and nutritional deficiencies. A number of immediate physiological effects may be produced by alcohol. One acute effect of alcohol may be toxic reactions which result in gastric irritation resulting in vomiting, unconsciousness, or both; or lethal effects which result from rapid ingestion (Levinthal, 1996). Contradictory to myths of alcohol warming-up the body, alcohol actually is a peripheral dilator which may increase bodily heat loss. Alcohol modifies reabsorption and elimination of water from the body and these modifications may be a serious concern, especially if considerable exercise has occurred immediately prior to ingestion. Alcohol alters functioning of the cardiovascular system, adversely affects sleep patterns, interacts with many other drugs, and may produce hangovers. Emergency signs of acute alcohol intoxication include stupor or unconsciousness; cool or damp skin; weak, rapid pulse; shallow and irregular breathing; and pale or bluish skin (Levinthal, 1996; Payne & Hahn, 1992; and Victor, 1976).

Chronic overuse of alcohol has been associated with three forms of liver disease (fatty liver, alcoholic hepatitis, alcoholic cirrhosis); cardiovascular problems; increased risk of several types of cancers; and cognitive impairments (e.g., alcoholic dementia, Wernicke-Korsakoff syndrome, and Korsakoff's psychosis). Chronic abuse of alcohol also is associated with increased physical injury resultant of accidents or violence, and is the direct cause of birth defects resulting from fetal alcohol syndrome (Serdula, Williamson, Kendrick, Anda, & Byers, 1991).

Chronic effects of alcohol results in tolerance and alcohol-dependence resulting in withdrawal (Levinthal, 1996; Parsons, 1996). One type of withdrawal, alcohol withdrawal syndrome, is associated with tremor, nausea and vomiting, sweating, agitation, anxiety, increased heart rate, increased blood pressure, and, in some cases, tonic-clonic seizures. A second type of withdrawal results in a cluster of symptoms referred to as delirium tremens [DTs]. During DTs, the possibility of life-threatening events such as heart failure, dehydration, or suicide may occur. Thus, hospitalization and medication are often recommended. Other symptoms which typically are associated with DTs include disorientation and confusion, fever, nightmares, profuse sweating, and hallucinations.

Dependence on alcohol is associated with tremendous economic burden; with a tremendous amount of human suffering for the individual and family members; with decline in work productivity, accidents on the job, and unemployment; with increased criminal behavior and violence; with motor vehicle accidents and other accidents associated with significant property damage and injury to others; and with physical, emotional, and cognitive difficulties for which societal supports may be required for many years (Leung, 1976; O'Donnell & O'Callaghan, 1997; Sher, 1991).

Inhalants

Since recorded history, mind-altering effects of inhaled substances have been known (Levinthal, 1996). Inhalation of fumes or burning substances has been linked to medical and religious ceremonies or rites as early as 3000 B.C. (Flournoy, 1974). Substances used as inhalants in present times are widely available and include such products as aerosol sprays, solvents, glues and other adhesives, typewriter correction fluid, permanent felt marker ink, gasoline, cleaning compounds and disinfectants, paints and paint thinners, fingernail polishes and polish removers, dry-cleaning products, a wide variety of other petroleum products, amyl nitrite, butyl nitrite, and nitrous oxide (Haverkos & Dougherty, 1988; Newell, Spitz, & Wilson, 1988; Sharp, Beauvais, & Spence, 1992; Siegel & Wason, 1992).

Inhalant abuse is rooted in psychological dependence rather than in physiological dependency (Oetting, Edwards, & Beauvais, 1988). Symptoms that have been associated with inhalant abuse include sneezing and sniffing; coughing and bad breath; nausea, vomiting, diarrhea and loss of appetite; headaches and dizziness; light sensitivity and irritated eyes; rash around the mouth; double vision; ringing in the ears; chest pains and cardiac arrhythmia; muscle and joint aches; slurred speech; muscle incoordination; hallucinations; euphoria, giddiness, and exhilaration (Flournoy, 1974; Fox & Forbing, 1992; Levinthal, 1996; Schuckit, 1989).

Toxic effects of inhalants vary considerably depending not only upon the inhalant drug but also upon accompanying compounds (which may not appear on the product label) (Levinthal, 1996; Maickel, 1988). Typically, inhalants act as CNS depressants (Flournoy, 1974). Inhalation of propane and butane have been linked to cardiac arrhythmia and death (Levinthal). Commonly, serious side-effects are linked to lack of oxygen or to hypoxia and asphyxiation. Freon has the unique effect of being so cold that it may actually freeze the larynx and throat upon contact. Prolonged use of inhalants has been linked to damage of the respiratory tract; cancer-related disorders (such as leukemia and Kaposi's sarcoma); peripheral nerve damage leading to muscular weakness and muscle atrophy; anemia; dysfunction of the cerebellum resulting in difficulties in movement and coordination; alterations in cardiovascular functioning and blood cell abnormalities; glaucoma; and cognitive damage resulting in confusion, disorientation, impaired judgment, inaccurate perceptions, and memory loss (Levinthal; Maickel). Some inhalants, specifically nitrous oxide, are believed to be associated with birth defects (Brodsky, 1985; Maickel).

Marijuana

Chinese writings five thousand years ago refer to marijuana (Levinthal, 1996). In the United States, marijuana was contained in medicines during the 1880s and became popular in the 1920s. Marijuana is composed of cured leaves, small stems, and flower clusters of the *Cannabis sativa* plant. The strength of marijuana is related to the type of plant as well as the conditions in which it is grown and the sex of the plant. Drying, curing, storage, and handling procedures also impact the potency of the final product (Gurley, Aranow, & Katz, 1998). The primary psychoactive ingredient in marijuana is delta-9-tetrahydrocannabinol or δ -9-THC. Potency typically ranges from approximately 4-7% δ -9-THC levels although some sinsemilla types of marijuana have δ -9-THC levels that are as high as 14% (Gurley et al., 1998).

Acute effects of marijuana include reddening of eyes, cardiac acceleration, giddiness, feelings of euphoria, increased hunger, heightened sexual desire, perception of time elongation, impairments of attention and memory, and diminished ability to perform complex visual-motor skills. Marijuana can be administered in a number of ways, including eating it in foods (such as brownies and cookies), mixing it with clarified butter for use in foods, extracting it in teas, creating an alcohol-based tincture, and smoking it. Ingested marijuana tends to have a slower onset of action and a longer duration of effect than the smoked variety (Gurley et al., 1998).

Chronic use of marijuana does not produce physical dependence in moderate dosages (Levinthal, 1996), but physical dependence has been demonstrated with large doses (Jones & Benowitz, 1976). Only mild psychological dependence occurs for most users but a small number of marijuana users do become dependent upon daily use (Ray & Ksir, 1996). Marijuana smoking is thought to have carcinogenic effects similar to those resultant of tobacco smoking (Howlett, 1990). Although marijuana use has been commonly believed to result in amotivational syndrome (Fox & Forbing, 1992; McGothlin & West, 1968) and to serve as a gateway to the use of other drugs (Johnston, O'Malley, & Bachman, 1994), neither of these beliefs have been supported by research (Sommer, 1988). Medically, marijuana has been used with success to treat effects of glaucoma (Cohen, 1980); to reduce the effects of asthma, to control seizures, and for treatment of migraines (Gurley et al., 1998); and as an

antiemetic agent (to reduce nausea) for persons undergoing chemotherapy or for individuals who have AIDS (Doblin & Kleiman, 1991; Grinspoon & Bakalar, 1993).

LSD and other Hallucinogens

Drugs referred to as hallucinogenics are most accurately described as resulting in states of altered awareness or perceptions rather than as being associated with hallucinations in the classic sense (Ray, 1996). Approximately four (Ray) or five (Levinthal, 1996) different types of hallucinogens exist, with each type having its own set of effects and specific neurotransmitters that it acts upon. Common subjective effects of hallucinogens include altered perceptions and an intermingling of senses or synesthesia, (e.g., colors are heard and sound waves are seen), visual distortions and perceptions of multilevel reality (e.g., seeing a chair and the molecules composing it), different and exaggerated appearances of objects or experiences such as an object melting or cutting an orange being experienced as tearing apart an animal, color enhancement, mental imagery, change in mood, disintegration in self boundaries, and the experience of altered time (Brown, 1972; Goode, 1989; Levinthal; Snyder, 1986). Considerable variation exists in the response to hallucinogens, both between individuals and in the same individual (Abraham, Aldridge, & Gogia, 1998).

Hallucinogens have no withdrawal effects (Abraham et al., 1998). Major risks of abuse of hallucinogens include "bad trips" (characterized by an adverse experience which may be associated with panic reaction and loss of emotional control) and flashbacks (in which the person reexperiences a bad trip when not using the substance). Unlike other hallucinogens, one, MDMA ("ecstasy") which is an amphetamine derivative that is related both to amphetamines and hallucinogens, has been associated with brain damage (Levinthal, 1996; Ray & Ksir, 1996). MDMA was patented in 1914 and returned as a designer drug in the late 1980s and early 1990s (Elk, 1996). MDMA is a white powder which is most commonly administered orally as a pill or capsule but it can also be administered intravenously or subcutaneously, by snorting, by smoking, and less frequently, as a suppository. Some of the psychoactive properties of MDMA (e.g., increased energy, euphoria, feelings of closeness to others, empathy and enhanced communication, and a need for intimacy) made it appealing as a potential therapeutic aid in psychotherapy. The hallucinogenic effects of MDMA are not as intense as those of other hallucinogens (e.g., LSD or mescaline), with hallucinations reported by users only 20% of the time.

LSD, lysergic acid diethylamide, is the best known hallucinogenic drug. LSD is synthetically derived from a fungus, ergot, that is present in molded rye and some other grains (Levinthal, 1996). Ergotism ("St. Anthony's fire") is believed to have occurred periodically during the Middle Ages when, due to famine, people baked bread from infected grain. One episode of ergotism in 944 A.D. is estimated to have resulted in 40,000 deaths (Mann, 1992). LSD affects brain receptors sensitive to serotonin. Although LSD is thought to be one of the most powerful psychoactive drugs known, it is believed not to produce either psychological or physical dependence (Goode, 1989; Levinthal). Although the possibility exists that birth defects may occur if ingested during pregnancy, LSD, contrary to some popular beliefs, does not cause panic or psychosis in otherwise mentally healthy individuals, does not increase creativity, does not damage chromosomes, and has not been scientifically linked to violent behavior. Flashbacks have been associated with LSD.

Caffeine

Western societies are so accepting of caffeine that it is used on a daily basis by more people than any other psychoactive drug (Kendler & Prescott, 1999; Ray, 1996). Caffeine is a member of a family of stimulant drugs called xanthines and is found in coffee, tea, chocolate, cola drinks, and several medications (Levinthal, 1996). Caffeine ingestion results in dilation of peripheral blood vessels and constriction of cerebral blood vessels, slight elevation in heart rate, and a bronchodilating effect. Caffeine excites neuronal activity in the brain, resulting in a feeling of mental alertness and lack of fatigue. While caffeine increases attentiveness and vigilance to low stimulus tasks, it has no effect or a deleterious effect on performance of complex tasks. With caffeine ingestion, a decrease in quality of sleep or difficulty in falling asleep may occur but these effects are lessened in chronically heavy caffeine users.

Data is inconclusive about the relationship between caffeine ingestion and cardiovascular functioning (Jick et al., 1973). Caffeine consumption has been associated with osteoporosis and bone fractures in elderly persons (Kiel, Felson, Hannan, Anderson, & Wilson, 1990), with infertility and with miscarriages, and with the onset of panic attacks in persons diagnosed with panic disorder.

Amphetamines and other Stimulants

Amphetamines are a group of psychoactive stimulants (Levinthal, 1996; Murray, 1998; Ray & Ksir, 1996) whose reasons for use and problems of abuse are very similar to those for cocaine. The origination of amphetamines has been traced to a Chinese medicinal herb that 5,000 years ago was used to treat asthma and respiratory problems. The first synthetic form was developed in 1927 for use in non-prescription inhalers. Abuse has occurred through oral use, by injection, and by inhalation.

Acute effects of amphetamines include increased sympathetic autonomic activity, decreased feelings of fatigue, feelings of euphoria, decreased sleepiness, increased confidence, decrease in depressive symptomology, decreased reaction time, and an increased threshold for pain perception (Levinthal, 1996; Ray & Ksir, 1996). Side effects may include restlessness, irritability, dry mouth, heart palpitations, increased speed of speech, muscle tremor, headaches, and nausea. Substantial evidence does not exist to substantiate the belief that brain damage occurs in humans associated with amphetamine abuse (Marek, 1990).

Amphetamines have been used successfully to treat narcolepsy and hyperactivity in children and for short-term weight reduction (Leung, 1976; Levinthal, 1996; Murray, 1998; Ray & Ksir, 1996). During World War II, amphetamines were used to increase efficiency of soldiers by Germany, in experiments on efficiency of soldiers by the United States, and to increase productivity of workers on the homefront by Japan (Benzedrine Alert, 1944; Hemmi, 1969; Kato, 1983; Ray & Ksir). However, research has indicated that while performance on some simple tasks may be improved by limited use of "smart pills" (amphetamines), performance on complex, difficult or both tasks is decreased (Ray & Ksir). Withdrawal from amphetamine use may include a physical and emotional "crash" resulting in prolonged sleep, depression, agitation, anxiety, inactivity, nightmares, headaches, cramps, tremors, and irritability.

Effects of chronic use of amphetamines include behavioral fixations in which actions are repeated continually, elevated mood, feelings of power, tendencies toward violence, and amphetamine psychosis. Amphetamine psychosis is similar to paranoid schizophrenia and is characterized by paranoia, mood swings, impulsive behavior, hypersensitivity, delusions, and hallucinations persisting for weeks after the drug has been withdrawn (Ellinwood, 1971; Goode, 1989). Various behaviors of Hitler toward the end of World War II have been described as resultant of a disintegrating personality associated with heavy amphetamine abuse (Maser, 1971).

Tobacco

Tobacco was an essential ceremonial thread in North America's indigenous populations for centuries. "The compulsive use of tobacco has been observed in nearly every culture to which tobacco has been introduced" (Benowitz, 1998, p. 283). It was not until its introduction to Europe some 500 years ago that tobacco became considered unhealthy or socially undesirable, having lost its ceremonial purpose (Hartman, Caskey, Olmstead, & Jarvik, 1998). Only within the past 50 years have researchers begun to seriously investigate the deleterious effects of tobacco, including its highly addictive properties.

Nicotine is the primary reinforcing ingredient in tobacco and "is well established as one of the most toxic drugs known" (Ray & Ksir, 1996, p. 284). In addition to nicotine, cigarette smokers consume tar and carbon monoxide. Acute effects of smoking nicotine include an increase in metabolic rate, a slight increase in blood sugar level, deadening of taste buds, constriction of blood vessels of the skin, decrease in skin temperature, increase in blood pressure, decrease in oxygen-carrying ability of the blood, decrease in emotions and improved performance for a few minutes in sustaining attention to a task that required rapid processing of information from a computer screen (Gilbert, 1988; Wesnes, 1988). Cigarette smoking is linked to increased risk of heart disease, lung and other cancers, emphysema, chronic bronchitis, and stroke (Schlaadt, 1992). Pregnant women who smoke increase risks for obstetrical complications; for premature labor and delivery; for miscarriage and stillbirth, for growth retardation, low birth weight and neurological damage to the infant (Cook, Peterson, & Moore, 1990; Levinthal, 1996).

Dangers of secondary smoke indicate that nonsmokers are at risk (American Cancer Society, 1987). Nonsmoking wives of husbands who smoke have a 30% increased chance of having lung cancer in comparison of wives of nonsmokers. If the husband is a heavy smoker, the risk is two to three times greater. Children of a parent who smokes have increased chances of having chronic coughs and ear infections, of developing colds, and of acquiring asthma or bronchitis in comparison with children of non-smokers. Smokeless tobacco, including

chewing tobacco and snuff, have been associated with increased risk of cancer of the oral cavity, pharynx, and esophagus; with gum disease; and with destruction of teeth enamel (NIH, 1986).

Barbiturates and Non-barbiturate Sedatives

Sedatives are drugs used to calm, to tranquilize, or to relax while hypnotics are drugs which are used to induce sleep (Levinthal, 1996; Ray & Ksir, 1996). Barbiturates represent a family of depressants which result in a sedative-hypnotic effect (Julien, 1995). Barbiturates were discovered by Adolf von Baeyer who also developed Bayer aspirin (Levinthal, 1996). Many different barbiturate drugs have been developed but all are almost tasteless and odorless and will induce sleep if the dosage is sufficient (Henningfield & Ator, 1986; Julien). Barbiturates have been used in the treatment of epilepsy since they slow down CNS activity. The length of time the depressant effect lasts is the primary basis for the classification of barbiturates as long-acting (six or more hours, e.g., phenobarbital or Luminal), intermediate (four to six hours, e.g., amobarbital or Amytal, Butabarbital or Butisol), or short-acting (less than four hours, e.g., Pentobarbital or Nembutal).

Tolerance and both physical and psychological dependence can develop with chronic use (Jacobs & Fehr, 1987); thus, barbiturates should be treated as highly addictive substances. A major consideration with barbiturate abuse is the potential of overdose, particularly if use is potentiated by combination with other depressants or alcohol (Jacobs & Fehr; Kauffman, Shaffer, & Burglass, 1985). Overdose of these depressant substances can result in inhibiting respiration to the point of death (Ray & Ksir, 1996), and the combination of barbiturates and alcohol have been used in many attempts to commit suicide (Palfai & Jankiewicz, 1991). Withdrawal from barbiturates needs careful management as withdrawal effects and symptoms can be severe and can result in death (Fraser, 1953; Sellers, 1988).

In the 1950s, drugs other than barbiturates, the benzodiazepines (which were referred to then as minor tranquilizers), began to become available for the treatment of anxiety (Palfai & Jankiewicz, 1991). Some benzodiazepines have been popular for the treatment of anxiety (e.g., Xanax, Librium, Valium, Ativan, Serax) and others for the treatment of sleep disorders (Restoril, Halcion). The most severe problem of misuse of benzodiazepines is their sedative hypnotic effects, including anterograde amnesia when given forcefully to someone as a "chemical knock out" in the preliminaries of intolerable or criminal behavior (Brinkmann, Kaplan, & Kauert, 1997). The benzodiazepines have proved to be less addictive than barbiturates and withdrawal symptoms are rarely as severe with benzodiazepines.

The benzodiazepines also are cross-tolerant with alcohol and other depressants. A newer type of antianxiety drug, Buspirone, shows less side-effects and no cross tolerance with alcohol or other depressants and no withdrawal symptoms (Lickey & Gordon, 1991). However, Buspirone has a long delay (several weeks) before relief from anxiety is experienced.

Opiates

The history of opioid use can be traced across major civilizations for approximately 8000 years (Uddo, Malow, & Sutker, 1993). The opiate drugs also are referred to as narcotics, whose Greek root means numbness. Opiates include a group of psychoactive drugs medically used for their analgesic (pain-reducing) effects. Opiates in general produce nausea and vomiting unless the user is accustomed to the drug. If heroin is injected, an immediate feeling of warmth in the lower abdomen and a feeling of intense euphoria, a "rush" results (Abel, 1985; Hofman, 1983). Next, a state of tranquil drowsiness ensues and is often referred to as being "on the nod." Other physiological changes which occur include a sudden release of histamine in the bloodstream resulting in red eyes and itching throughout the body, pupillary constriction, depression in breathing and blood pressure, and slowing down of the gastrointestinal track, resulting in constipation. Effects of other opiates will vary in degree depending upon the specific drug, the amount and the method of administration, and the person's level of tolerance. Opiates produce physiological and psychological effects equivalent to those resultant of the body's own release of endorphins (Dum & Herz, 1984; Levinthal, 1988; Olsen, Olsen, Vaccarino, & Kastin, 1998).

Narcotics are used medically to relieve pain, for the treatment of acute diarrhea, and to suppress coughing (Hofman, 1983). Physical and psychological addiction as well as tolerance develops from chronic use. Opioid use also has been associated with antisocial lifestyle, enduring dysphoric mood states, and pathological mental and physical conditions (Uddo et al., 1993). Illness and death may be associated with street-purchased narcotics due to impurities, to the inability of effectively judging purity of the substance, and AIDS/HIV transmission

associated with opioid injection.

Cocaine

Cocaine is an alkaloid derived from the leaves of the *Erythroxylum* plant found predominantly at high altitudes in Peru, Colombia, and Bolivia (Uddo et al., 1993). The Incas used coca to measure time and distance, describing a journey in terms of the mouthfuls of coca leaves that a person would need to chew to make the trip (Flynn, 1991).

Cocaine is classified as a stimulant that is capable of inducing euphoric excitement and hallucinatory experiences (Leung, 1976). Upon initial use it produces an elevation in the sympathetic autonomic nervous system and a burst of energy. In the United States, several medicines and beverages were sold that contained cocaine, the most notable was the original formulation for Coca Cola (Uddo et al.). Routes of administration are intravenous injection, smoking, and intranasal. In some parts of South America, coca chewing is still prevalent among certain groups. In the mid 1980s as much as 90 percent of the male Peruvian population of the Andean highlands regularly chewed coca leaves (Jaffe, 1985). Smoking provides the most rapid delivery of cocaine to the brain.

Physical signs that accompany cocaine abuse include enlarged pupils, increased heart rate; increased irritability; insomnia; fatigue; decreased appetite, significant weight loss, and malnutrition; sexual dysfunction; and snorting, sneezing, and nose irritation (Levinthal, 1996; Uddo et al., 1993). Health risks include myocardial infarction, stroke, seizures, and psychotic episodes (Robinson, Heaton, & O'Malley, 1999). In addition, paranoia, depression, apathy, loss of interest in personal hygiene, participation in dangerous and unlawful behavior, and financial ruin have been associated with cocaine abuse (Uddo et al.). Cognitive impairments of memory, attention, or language abilities also have been documented with chronic cocaine abuse (Gillen et al., 1998). Although these impairments persist well beyond the period of acute withdrawal, the cognitive deficits associated with cocaine abuse appear to be relatively mild and more restricted than those reported for alcoholics.

Use of crack cocaine emerged in the 1980s. Crack cocaine is a smokable form of cocaine which exceeds the effects of cocaine which is snorted (Flynn, 1991). The effects of crack cocaine that is smoked are fast and powerful, resulting in, according to one author, "uncontrollable psychological dependence" (Levinthal, 1996, p. 97). Deep depression may accompany long-term cocaine use and excessive cocaine use can result in a paranoid psychotic state (Gawin, 1991). "Postcocaine anguish" has been described as a powerful motivator for people to continue abuse (Nuckols, 1989; Weiss & Mirin, 1987). An interactive effect between cocaine and alcohol (ethanol) produces a new drug, cocaethylene, which is more toxic than either substance alone (Randall, 1992).

Prescription Drug Abuse

Medicinal drugs may require prescriptions or may be sold over-the-counter [OTC] without prescription. Abuse of prescription medication is common, often including taking medication differently than prescribed, taking medication for different purposes than prescribed, and taking medications prescribed for other persons. Various substances mentioned earlier such as barbiturates, the benzodiazepines, amphetamines, and some narcotics may be obtained through prescription (Chabal, Erjavec, Jacobson, Mariano, & Chaney, 1997) but will not be rediscussed here. One type of medication which is of concern for abuse but has not been mentioned earlier is anabolic steroids.

Anabolic steroids have been listed as a Schedule III controlled substance, requiring more record-keeping and limiting prescription refills because of their potentials for abuse and for physical damage (Levinthal, 1996). Synthetic anabolics have been shown to have significant muscle-developing ability and thus have been sought by athletes. However, users risk liver damage and changes in blood lipids which may lead to atherosclerosis, high blood pressure, and heart disease. In addition, steroids may effect growth plates in the long bones thus limiting adult height of adolescent or child users.

Non-prescription Drug Abuse

Over-the-counter drugs are approved by the Federal Drug Administration for use when taken in recommended dosages. One common form of abuse involves taking these medications with other than the recommended dosages, for other than the described reasons, or in some manner that is not consistent with directions. Misuse of OTC analgesic drugs can present significant health risks (Conlan, 1992). Analgesic drugs include formulations with aspirin, ibuprofen, or acetaminophen. Misuse of aspirin may result in delayed clotting, gastrointestinal

bleeding, an increase in the number of viruses present in cold sufferers, Reye's syndrome, or overdose poisonings. Acetaminophen has been associated with kidney and liver damage and ibuprofen with gastrointestinal problems. Sleep aids which contain either diphenhydramine or doxylamine succinate serve as CNS depressants and their effects may be potentiated by use of alcohol or other depressant drugs (Julien, 1995).

Cold and allergy products are commonly misused (Conlan, 1992). In particular, abuse of cough suppressants containing dextromethorphan, result in auditory and visual hallucinations, itching, nausea, and in some cases may be associated with seizures. OTC stimulants contain caffeine. OTC weight-control products contain phenylpropanolamine [PPA] and are prevented by the FDA from containing caffeine as the effects of ingestion of both PPA and caffeine have not been thoroughly studied. Concern is expressed about the stimulant effects of PPA upon persons with elevated blood pressure or cardiovascular disorders. Laxatives also are often abused and often persons with problems of constipation are cautioned against laxative abuse.

Models of Causation of Substance Abuse

A number of theories have been posited to explain the phenomenon of substance abuse; however, no single theoretical model fully explains why substance abuse occurs. The most widely known models of causation of substance abuse include the moral model, the medical model, the genetic model, the systems model, the behavioral model, the sociocultural model, and the biopsychosocial model. These seven models overlap in varying degrees in their attempts to clarify the etiology of substance abuse yet they are different in many ways. An overview of the therapeutic assumptions upon which each model is based is fundamental to understanding beliefs regarding the etiology of substance abuse.

The Moral Model

The moral model views substance abuse as the result of willful overindulgence and moral degradation (Erickson, 1998). Willpower and the desire to abstain are essential elements to overcoming substance abuse under the auspice of the moral model. Punishment is considered over treatment because a "cure" is considered unlikely. The moral model gained impetus during the Civil War when concern regarding heavy drinking arose in the United States. Figures of the church and conservative community members advocated that alcohol use was sinful, amoral, and intolerable. Individuals with alcoholism and other substance abuse problems were essentially treated as social outcasts.

The Medical Model

The shift away from the moral was accompanied by the development of Alcoholics Anonymous (AA) in 1935 (Erickson, 1998). Although the philosophy of AA retained some elements of the moral model, including the belief that a "Higher Power" is needed to achieve sobriety, supporters of AA believed that individuals who engaged in alcohol abuse were not responsible for having the "disease" of alcoholism. In the 1950s, Jellinek defined alcoholism as a disease and developed the theory that alcoholism is caused by a physiological deficit in an individual that makes him/her unable to tolerate alcohol. Two key elements associated with the disease model are loss of control over the use of a substance and progression of the disease which ultimately results in death. According to the medical model, all individuals with substance abuse problems have the same disease and treatment is essentially the same for all who abuse alcohol and other drugs, regardless of the factors which precipitated the substance abuse. Supporters of the disease or medical model believe that abstinence is the only effective form of treatment for substance abuse and that individuals with substance abuse problems are responsible for seeking treatment. In addition, alcoholism and other substance abuses are treated in the same manner, without recognition for the complex factors which accompany polydrug use.

The Genetic Model

Proponents of the genetic model maintain that hereditary traits predispose certain individuals to substance abuse (Erickson, 1998). Intergenerational studies, twin studies, and adoption studies have been used to show that relatives of alcoholics have a substantially greater risk for alcoholism than nonalcoholics. Researchers have attempted to identify specific biochemical genetic markers that could indicate physiological differences between

individuals who abuse alcohol and those who do not, including differing chemical breakdowns in the metabolism of ethanol. From the genetic perspective, alcoholism is considered a condition that arises from an imbalance in the brain's production of neurotransmitters responsible for metabolism of ethanol. Genetic predispositions to these imbalances make some people susceptible to developing alcohol abuse and addiction. Although children of alcoholic parents run a higher risk of developing alcoholism than children in the general population, genetic components of other types of substance abuse and addiction are less clear and, to date, research in this area is limited.

The Systems Model

Systems theorists look toward the family structure and family dynamics across generations to seek causative factors associated with substance abuse patterns (Erickson, 1998). The family systems theory views each family member in a synergistic manner, with each family member contributing to the family as a whole. Families of origin and the current family structure form a framework for perceptions of the roles one must play, one's place in the world, and the proper way to interact (Erickson, 1998). According to the systems model, viewing individuals who abuse substances in isolation of their family and the environment disregards the influences that others have on one's behavior. Achieving homeostasis within the family and making adjustments to maintain or restore equilibrium whenever it is threatened is a primary goal of the systems model. Individuals who abuse substances are described as being part of a family constellation in which substance abuse is a central theme around which the family is organized. Family changes occur when the substance is introduced into the family unit. Once the family assimilates the changes associated with the substance, these changes actually support the addiction or substance abuse.

The Behavioral Model

The behavioral model is imbedded in social learning theory (Erickson, 1998). Addictions are perceived as socially acquired, learned behaviors with multiple causes and effects. According to the behavioral model, substance abuse is seen as being influenced by past learning, reinforcement contingencies, biological make up, and cognitive processes. Although most behaviorists maintain that learning and contingencies are key elements relating to substance abuse and addiction, they do not discount the role of etiological factors such as genetics, sociocultural influences, and physiological conditions on predisposing a person to substance abuse. Supporters of the behavioral model posit that substance abuse occurs when an individual's coping abilities become overwhelmed. Thus, the abuse of substances is employed as a coping mechanism to counteract stressful situations yet the consequences of substance abuse in itself becomes increasingly stressful and leads to further substance abuse. Antecedents, including cognitive and emotional states, the time of day, the place in which drinking occurs, and association with certain people are considered to be important factors which can influence substance abuse. Addictive behavior is maintained by the rewarding aspects of drug consumption and the social setting. That is, the more pleasurable the experience of drug consumption and the greater the frequency of obtaining pleasurable experiences through drug consumption, the more likely that drugs will be consumed.

The Sociocultural Model

Sociocultural theorists emphasize social forces and cultural attitudes that influence substance abuse. Environmental support is considered to be an important factor contributing to substance abuse. Accordingly, the magnitude of social pressure in the development of substance abuse, particularly among adolescents is widely recognized (Erickson, 1998). Attitudes, tradition, and family values toward alcohol and other drugs varies across cultures and are viewed as largely impacting the amount and context in which consumption occurs. According to the sociocultural model, disruptive use of alcohol and other drugs tends to occur almost exclusively in social settings. Environmental factors which have been associated with increased substance abuse include single-parent households, urban ghettos, low socioeconomic status, limited educational opportunities, child abuse and neglect, and criminal activity. Societal trends also are considered to be important influences on substance use and abuse, with patterns and popularity of certain drugs changing over time. For example, throughout the 1960s and 1970s, marijuana, opiates, and psychedelic drugs were the drugs of choice. Cocaine was commonly used throughout the 1980s and crack cocaine has become a commonly used drug in the 1990s.

The Biopsychosocial Model

The biopsychosocial model views substance abuse as a complex, progressive behavior pattern that is influenced by biological, psychological, and social components (Erickson, 1998). This integrative model focuses on genetic factors which may predispose a person to substance abuse as well as a variety of mitigating sociocultural influences which can lead to the development of alcoholism and drug addiction. Psychological factors that may interact with genetic predispositions and sociocultural influences include personality traits, learned behaviors, and cognitive deficiencies that can influence substance abuse. Thus, all contributing factors in the development of substance abuse are considered within the biopsychosocial model.

Characteristics of the Individual and Society

Physiological Functioning of the User

Efforts to study physiological bases of substance abuse have been greatly hampered by the possible alterations in physiology as a result of chronic abuse of substances and unknown chemicals which may have been mixed with them; and as a result of lifestyles which may be composed of poor nutrition, poor exercise habits, poor sleeping habits, stress, general neglect, and sometimes violence and prostitution. To determine if altered physiology of the abuser is the result of pre-drug physiology or changes as a result of substance abuse itself is often impossible.

Using the Substance Abuse Subtle Screening Inventory (SASSI), Baker and Dooley (1998) concluded that college students with disabilities who took prescription medications on a regular basis were more likely to be identified as having substance abuse problems than were students with disabilities who were not regularly taking medications. They concluded that 50% of the college students with disabilities in their study had substance abuse problems.

Various authors have studied family history of drug disorders and have concluded that having a family member with a substance abuse problem constitutes a strong risk factor for developing a substance abuse disorder (Merikangas, Stolar, Stevens, Goulet, & Preisig, 1998). In a study of 3,516 twins from male-male pairs, the authors concluded that genetic factors played a major role in the development of alcoholism among males and that environmental factors in common for family members had little influence on whether males became alcoholic (Prescott & Kendler, 1999).

Another recently published study including 392 twin pairs, male and female, concluded that genetic influences were stronger for males than for females but existed for females and that genetic factors were linked to substance abuse, dependence or both, but not to substance use (van den Bree, Johnson, Neale, & Pickens, 1998). Some studies have also noted a correlation between alcoholism and neuropsychological impairment (Keenan, O'Donnell, Sinanan, & O'Callaghan, 1997).

Psychological Characteristics of the User

A purpose of a number of studies on substance abuse was to determine the foundation of the "addictive personality" that caused the person to continue to abuse a substance. Such research has led to the conclusion that there is no one central personality characteristic that leads a person to addiction (Cox, 1986). Such studies have led to the conclusion that personality may make some contribution to addiction but that it is not the sole cause of any addictive behavior to any particular substance.

A tendency has existed to demonize drugs and to attribute substance abuse to the drugs themselves. However, "Reinforcement is increasingly accepted as the real driving force behind drug addiction, (Ray & Ksir, 1996, p. 42) rather than the drugs, themselves. Some researchers have drawn conclusions about drugs that serve as "gateways" to abuse; drugs which are one of the first drugs used by an abuser. However, studies involving gateway drugs have typically used abusers only as subjects and failed to study subjects who used the "gateway" drug who did not proceed to abuse other drugs (Johnson, Gollub, & Fagan, 1995).

Many attempts have been made to study psychological characteristics of persons with substance abuse problems (Patalano, 1998). Such attempts are often complicated by studying persons after abuse occurs. If determination of pre-abuse psychological functioning is not made, then deciding what psychological characteristics laid a foundation for abuse and what psychological characteristics may be resultant of abuse is impossible.

Sociocultural Environment

Most of the information about drug use comes from large national surveys conducted in high schools or house-to-house (Ray & Ksir, 1996) or from DAWN, the Drug Abuse Warning Network. DAWN collects data from hospital emergency rooms and from medical examiners on drug-related crises and deaths.

Certain factors appear to be strong indicators for drug-taking behavior for youth (Goode, 1989; Newcomb, Maddahian, Skager, & Bentler, 1987). The strongest indicators for adolescents using drugs appear to reflect a tendency toward nonconformity with society. The more of the following characteristics that the young individual possesses, the more at risk for substance abuse that person may be

- (a) attending school irregularly (not due to illness),
- (b) having poor relationships with parents,
- (c) getting into trouble,
- (d) an early history of alcohol intoxication beginning at age 12 or earlier,
- (e) the number of adults the youth knows that have drug problems,
- (f) the degree to which peers approve of getting high on drugs, and
- (g) generally low educational aspirations.

Parental abuse and economic hardship do not appear to correlate with substance abuse among adolescents (Fawzy, Coombs, Simon, & Bowman-Terrell, 1987) although some authors still indicate concerns about these as risk factors (Hanson & Carta, 1995). While other factors may affect beginning use of drugs, for persons who become addicted to a substance, increasingly the person's experience with the drug becomes central. Thus, the drug and its effects upon that individual become more important to continuing use than do social, cultural, or practical influences.

Drug-Classification

Depending upon needs, the conceptual basis for classification of drugs may vary. Thus, a variety of systems have been used for classifying drugs. Some common bases for classification have included: chemical structure, used frequently by biochemists; origin or source, often used by anthropologists, biologists and chemists; site or mechanism of action, as a means of determining or predicting physiological change; on the basis of their effects, yielding information for psychologists and human service providers interested in human behavior; and potential for abuse yielding significant information for treatment-oriented clinicians as well as for school, legal, justice, and law enforcement personnel and for parents and communities.

Under the Comprehensive Drug Abuse Prevention and Control Act of 1970, a classification system was legally adopted which attempted to organize drugs into five categories, referred to as schedules, based upon their potential for abuse (Levinthal, 1996). Schedule I included substances with a high potential for abuse and no acceptable medical use (e.g., heroin, LSD, marijuana, and mescaline) (*Physician's Desk Reference*, 1994). Schedule II contains substances with a high potential for abuse and some accepted medical use (e.g., codeine, morphine, cocaine, amphetamines, and short-acting barbiturates). Schedule III includes drugs with some potential for abuse and an accepted medical use (e.g., long-acting barbiturates and narcotic solutions such as paregoric or mixtures such as 1.8% codeine). Schedule IV contains drugs with a low potential for abuse and an accepted medical use (e.g., antianxiety drugs and sedativehypnotics such as Valium and Miltown). Schedule V contains drugs with minimal abuse potential and widespread medical use (e.g., laxatives and cough medications not containing codeine). Progressively more restrictions are placed upon drugs in moving up the classification system from Schedule V to Schedule I.

Not only have drugs and their effects been classified into categories, but the behaviors of individuals whose substance use is generally regarded as falling outside the range of appropriate, normal or both, also has been classified in the *Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV)* published by the American Psychiatric Association (1994). Substance-Related Disorders listed in the *DSM-IV* include disorders which are related to taking a drug of abuse, to the side effects of medication, and to toxin exposure. Substance-Related Disorders are divided into two groups, substance-use disorders and substance-induced disorders. Substances in the *DSM-IV* are grouped into 11 classes. The diagnostic categories related to substances in the *DSM-IV* are listed and discussed individually in Chapter 5 of this book.

Drug Regulation

Prior to the 1900s, the attitude toward drug addiction in the United States was one of laissez-faire, to allow people to do as they pleased (Brecher, 1972). Addiction of adults or children was not viewed with concern or scorn. Thus, regulation of drugs and drug use was not a concern. The two exceptions were movements to ban alcohol consumption and a strong opposition to the practice among some Chinese immigrants of smoking opium. Prior to the 1900s, cocaine was contained in coca-cola and in other beverages and medicines; opium prescriptions with multiple renewals were common; patent medicines contained large amounts of alcohol, opiates, and cocaine; morphine was readily available; and heroin was used to treat morphine addiction.

In 1906, the Pure Food and Drug Act was passed and required that food and drug manufactures list on the label the amounts of alcohol or habit-forming drugs contained in their products. The Harrison Act of 1914 was an attempt to regulate opiates and cocaine. It required that physicians, dentists, and veterinarians prescribe such drugs "in the course of their professional practice only." In 1920 The Eighteenth Amendment to the U.S. Constitution took effect, beginning the era of Prohibition which lasted for the next 13 years (Aaron & Musto, 1981). The Marijuana Tax Act of 1937 taxed growers, sellers, and buyers of marijuana (Brecher, 1972). At that time, federal law did not make possession of marijuana illegal but state laws began to. Another notable law was the Comprehensive Drug Abuse and Prevention and Control Act of 1970 which was an attempt, as mentioned previously, to control and regulate drugs according to a ranking system based upon medical use and addiction potential (Levinthal, 1996). The 1970 Act also moved the Administration of Drug Enforcement from the Treasury Department to the Justice Department, ending efforts to regulate drug-taking through taxation.

Summary

Although the term, "drug" carries negative connotations, drugs, used correctly, have significant benefits to mankind. However, the misuse, abuse, overuse and illegal use of drugs results in a number of psychological, physical, and social problems. Information about drugs and their effects and about substance abuse may assist counselors in understanding and working with clients.

Drugs affect the human body in many different ways and individual variations occur with any drugs. Healthy adult males under age 35 typically comprise the samples for which the effects of drugs are examined. Drugs have been used across the world for thousands of years; however, scientific exploration of the deleterious effects of drugs was not widely pursued until the past century. The effects of drug abuse and dependence vary, depending on the type of drug, polydrug use, and characteristics of the user. The influence of genetic, neurochemical, neurophysiological, psychological, sociocultural, and economic factors suggest that the etiology of substance abuse and dependence is multiply determined.

The Drug Abuse and Prevention Control Act was passed in 1970. The Act included the development of a drug classification system which was used to organize drugs based on their potentials for abuse. Because of the increased concern about social problems associated with substance abuse across America, beginning in the early 1900s, a number of laws designed to regulate and control drugs have been passed. Models explaining the causation of substance abuse have arisen and various classification systems for drugs, their effects and the behavior of persons abusing drugs have been developed.

An overview of characteristics of drugs commonly abused and their effects was presented in this chapter. Drugs included were: alcohol, inhalants, marijuana, LSD and other hallucinogens, caffeine, amphetamines and other stimulants, tobacco, barbiturates and non-barbiturate sedatives, opiates, cocaine, prescription drug abuse, and abuse of over-the-counter medications.

Information about drugs and about important aspects of substance abuse included in this chapter provides counselors with valuable perspectives that they can use to increase the effectiveness of their communications with clients and with others who work with or care about consumers and their families.

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Drug Addiction

Mae Smith and Eva Miller

Rationale

Drug addiction has reached epidemic proportions in America over the last decade. The detrimental effects of drugs on the human body and brain are widespread. A number of physiological and psychological characteristics of the user as well as sociocultural environmental factors of the user have been associated with drug addiction. Drug classification systems have been established to organize drugs based on their medicinal properties and their potential for abuse; and the legal system has taken action to reduce and prevent drug addiction. Education on the effects of drugs, characteristics of drug users, and legal measures established to combat drug use can have a major impact on drug addiction.

Overview

The following lesson describes the characteristics of some of the most commonly used drugs in America. The effects of these drugs on functioning are identified. Examination of the physiological, psychological, and sociocultural characteristics of the drug user can assist students in identifying risk factors associated with drug addiction. An understanding of drug classification systems provides valuable information regarding a drug's potential for abuse. Knowledge of the laws that have been enacted to reduce and prevent drug addiction are important to increase students' comprehension of drug addiction.

Objectives

1. To increase awareness of the characteristics of commonly used drugs in America.
2. To increase understanding of acute and chronic effects of drugs on physiological, psychological, and cognitive functioning.
3. To increase understanding of physiological and psychological characteristics of the drug user.
4. To increase understanding of sociocultural environmental characteristics of the drug user.
5. To increase awareness of drug classification systems.
6. To increase awareness of federal laws established to reduce and prevent drug addiction.

Activities

The following exercises will provide students with opportunities to learn about commonly used drugs and the relationship between drug addiction and environmental influences, biological factors, and drug classification systems and laws. Each exercise corresponds with the respective objectives identified above.

Exercise 1 for Objective 1: Characteristics of Drugs

Divide students into small groups of two to six.

1. Provide each group with written information regarding the characteristics of one or two drugs (e.g., alcohol and/or marijuana).
2. Inform each group that they will be presenting the information they have received to the other students at a "Drug Fair."
3. Provide examples of the various ways in which students can present the information they have received (e.g., posters, verbal presentations, brochures, overheads).
4. Allow students 20-30 minutes to prepare their presentations.
5. Request half the groups to present their information at the Drug Fair while the other half serve as members attending the fair. Allow 10-12 minutes for students to visit each "drug booth." A bell or switching the lights on/off can be used as the signal for students to move to the next booth.

6. After students have visited each drug booth, request them to provide information on characteristics of the drugs they have been assigned to cover while the other groups visit each drug booth (again 10-12 minutes per booth).

Exercise II for Objective 2: Acute and Chronic Effects of Drugs

A minimum of 11 students are required for this "Hollywood Squares" exercise.

1. Request two students to serve as contestants (contestant "X" and contestant "O").
2. Request nine students to serve as famous celebrities. Provide name tags for students to identify themselves (e.g., Tom Cruise, Nicole Kidman).
3. Request additional students to serve as the TV audience.
4. The instructor serves as the game show host (Whoopi Goldberg).
5. Explain the rules of the Hollywood Squares game ("TIC-TAC-TOE").
 - A. Contestants take turns choosing a celebrity who in turns answers a question relating to the effects of drugs on functioning (e.g., "True or False: Chronic use of marijuana does not produce dependence in moderate dosages."). The instructor (Whoopi) reads the questions (questions can also be displayed on overheads).
 - B. The contestant has the option of agreeing or disagreeing with the celebrity's response. If the contestant responds correctly (e.g., agrees with the celebrity when the celebrity provides a correct response) the celebrity will hold up an "O" for contestant "O" and an "X" for contestant "X."
 - C. The first contestant to get "TIC-TAC-TOE" (three Xs or three Os horizontally, vertically, or diagonally) wins the game.
6. The game takes between 20-30 minutes and can be played several times so students who served as the TV audience can participate as contestants or celebrities.

Exercise III for Objectives 3 and 4: Physiological, Psychological, and Sociocultural Characteristics of the Drug User

Divide students into groups of four to eight.

1. Inform students that they are being given an opportunity to convey information in a creative way by role playing an "infomercial" pertaining to the physiological, psychological, and sociocultural characteristics of drug users.
2. Provide each group with packets of information on the characteristics of drug users.
3. Provide each group with directions informing them of the type of infomercial they are being requested to role play. An example of an "Oprah" infomercial is presented below:
 - A. Your group will be acting out a segment from the "Oprah" show.
 - B. The host (Oprah) and cast in the show will be acting out information provided in your packet (i.e., psychological characteristics of drug users). Everyone is to participate in the Oprah segment (which can include commercial breaks).
 - C. Your group is to work together to plan the Oprah segment which will be approximately 15 minutes in length. Everyone is expected to play a role in the show (e.g., Oprah, an expert on the psychological characteristics of drug users such as a psychologist or a physician, a drug user and his/her family members).
 - D. When you convey the information presented in your packet, you are encouraged to be creative. Examples include:
 - E. Allow approximately 30 minutes for groups to prepare their infomercials.

Exercise IV for Objective 5: Drug Classification Systems

Divide students into five groups.

1. Assign each group member a number from one to five. If there are more than five members in each group, assign two or three students the same number (e.g., if there are 10 students in a group, two students will be assigned as number one, two will be assigned as number two, etcetera).
2. Inform students that they will leave their "home groups" for 15-20 minutes to become experts on the

- five drug classification categories/schedules. Students in each expert groups will be assigned one drug classification schedule.
3. Students in each expert group are to compile information relating to their assigned drug classification schedule. This information can be obtained from the textbook and additional information (e.g., articles) provided by the instructor.
 4. Request students to return to their home groups after 15-20 minutes. Each student will be asked to share information they obtained/compiled in their expert groups. The concept is for each student(s) to provide pieces of information (or parts of a jigsaw puzzle) that will ultimately result in completion of the entire drug classification system (the five classification schedules or the entire puzzle).
 5. Facilitate a debriefing on the five drug classification systems (10-15 minutes) with the entire class to ensure that they have accurate information.

Exercise V for Objective 6: Drugs and the Law

1. Facilitate a discussion on the rationale for laws designed to reduce and prevent drug addiction in the United States. Discuss historical perspectives (e.g., social, economic, and moral implications) that have led to current drug legislation.
2. Facilitate further discussion on federal drug-related laws (state and local if desired) that are currently in existence.
3. Divide students into groups of two to six to discuss their views pertaining to the effectiveness of current drug legislation, reasons why they believe legislation has or has not been effective for reducing or preventing drug addiction, speculation of future trends regarding drug addiction based on current legislation, and recommendations for revising or creating additional drug-related laws.
4. Facilitate a large group (class) debriefing of the small group activity.